

## **REMARKS**

In the foregoing amendments, Applicants amend independent claims 5, 8, and 11 to positively require that the claimed method prevents corrosion of metal and formation of hydrogen chloride, as discussed throughout the present application including the title of the invention. Applicants previously canceled 1-4, 6, 7, 9, and 10 without prejudice or disclaimer of the subject matter set forth therein. Accordingly, claims 5, 8, and 11-14 pend in the application for consideration by the Examiner. Applicants respectfully request reconsideration and allowance of these claims.

In the foregoing amendments, Applicants also amend claims 5 and 8 by removing the parentheses therein. The Office Action mentioned these parentheses in the rejection of claims 5 and 8 under the second paragraph of 35 U.S.C. §112. Applicants respectfully submit that claims 5 and 8 particularly point out and distinctly claim the subject matter regarded as the invention within the meaning of 35 U.S.C. §112, second paragraph. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

The Office Action rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Shimura (JP 2002-129366A) in view of Vercammen (U.S. Patent No. 7,279,089) on pages 3 and 4. In two separate rejections on pages 4-6, the Office Action rejected claims 8 and 11-14 under 35 U.S.C. §103(a) as being unpatentable over Braden (U.S. Patent No. 5,965,785) and Vercammen. Applicants respectfully submit that any combination of Shimura, Braden, and/or Vercammen does not disclose all elements required in claims 5, 8, and 11-14. In addition, Applicants respectfully submit that one of ordinary skill in the art would not have a reason to combine the teachings of Shimura or Braden with those of Vercammen in the manner asserted in

the Office Action so as to arrive at the presently claimed invention. Finally, Applicants respectfully submit that the presently claimed invention has unexpected advantages over the combined teachings of Shimura and Vercammen or the combined teachings of Braden and Vercammen.

None of Shimura, Braden, and/or Vercammen teach the presently claimed methods, which include, *inter alia*, adding a quaternary ammonium compound of general formula [1] (e.g.,  $\beta$ -hydroxyethyl) trimethylammonium hydroxide ) to feed water, fluid containing water, or desalted crude oil in between a crude oil desalter and a main distillation column in the crude oil atmospheric distillation unit, whereby corrosion of metal and formation of hydrogen chloride is prevented.

Independent claims 5, 8, and 11 all require that the claimed method prevents corrosion of metal and formation of hydrogen chloride. On the other hand, the teachings of Vercammen, which were used in all the rejections of Applicants' claims as teaching the presently claimed quaternary ammonium compound, are concerned with preventing fouling and corrosion caused by ammonium chloride and ammonium sulfate. Applicants respectfully submit that one of ordinary skill and the concerned with the presently claimed method of preventing corrosion of metal formation of hydrogen chloride would not look to the teachings of Vercammen to modify other teachings, such as those of Shimura or Braden, because the method of Vercammen (preventing fouling and corrosion caused by ammonium chloride and ammonium sulfate) is not sufficiently related to the presently claimed methods (preventing corrosion of metal and formation of hydrogen chloride) to provide a reasonable expectation of success.

With respect to claim 5, the Office Action acknowledged that neither Shimura nor Vercammen teach adding the presently claimed amounts of 0.4-4 mg/L of the presently claimed quaternary ammonium compound, thereby preventing corrosion of metal and formation of hydrogen chloride. While the Office Action stated that the presently claimed amounts are implicit in Shimura, this cannot be true because Shimura does not teach the presently claimed quaternary compound, as acknowledged in the Office Action. In other words, the amounts of a compound cannot be implicit (inherent) in a teaching reference, when the reference (Shimura) does not describe the compound therein. On the other hand, Vercammen is concerned with a compound added to crude oil during refining, which is not an aqueous solution, and therefore the concept of pH appear meaningless within these teachings. Therefore, the combined teachings of Shimura and Vercammen cannot possibly suggest the amounts of 0.4-4 mg/L which result in the pH, as required in present claim 5.

In addition, Applicants respectfully submit that the teachings of Vercammen cannot be properly combined with those of Shimura, as well as those of Braden. The Office Action has not provided a sufficient reason for one of ordinary skill in the art to combine the teachings of Vercammen with those of Shimura or Braden. Consider, for example, the combination of Shimura and Vercammen, the teachings of Shimura add a counteractive amino liquid made with pure water or soft water into an inactive boiler. Shimura is not concerned with crude oil refining. On the other hand, Vercammen is concerned with an additive added to crude oil during the refining process. For such reasons, Shimura and Vercammen are not analogous art as alleged in the Office Action. Those skilled in the art understand the differences between an additive for an aqueous solution used in an inactive boiler and an additive for use in crude oil refining, and one

of ordinary skill in the art would not substitute a compound used in a refining process, such as that proposed by Vercammen, into a process for treating an inactive boiler as proposed by Shimura, or *vice versa*, with any expectation of success. Applicant respectfully submits that the statement in the Official action concerning the use of the quaternary ammonium compound proposed by Vercammen in the method of Shimura incorporates the impermissible use of hindsight reasoning to modify and combine the references in a manner required to meet the limitations of the claims. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). There is no suggestion or motivation in either Shimura or Vercammen for combining these references in the manner required to meet each and every limitation of Applicants' claim 5.

At least for these reasons, Applicants respectfully submit that the invention as currently recited in claim 5 is patently distinguishable from the combined teachings of Shimura and Vercammen. Therefore, Applicants respectfully request that this rejection be reconsidered and withdrawn.

Applicants respectfully submit that claims 8 and 11-14 are patently distinguishable from the combined teachings of Braden and Vercammen for the foregoing reasons concerning the teachings of Shimura and for those that follow. The Office Action acknowledged that Braden does not teach a quaternary ammonium compound described in general formula [1] or  $\beta$ -hydroxyethyl trimethylammonium hydroxide as required in present claims 8 and 11.

Applicants previously explained that no reason has been provided explaining why one of ordinary skill in the art would combine the teachings of Braden and Vercammen. For example, claim 8 is directed to a method for preventing metal corrosion in an atmospheric distillation column for a petroleum refining process and has been amended to recite that only the quaternary

ammonium compound is added to the fluid *containing water*. Support for this amendment can be found in the specification, for example, at page 22, lines 3-14. Applicants can find no discussion within the teachings of Vercammen suggesting that the quaternary ammonium compound proposed therein is added to a fluid containing water, as required in present claim 8 at the location required in present claim 8 of the process. For this reason alone, Applicants respectfully submit that the combined teachings of Braden and Vercammen cannot disclose or suggest the invention of present claim 8.

Claim 11 is directed to a method of inhibiting hydrogen chloride formation in a crude oil atmospheric distillation unit and has been amended to recite that only ( $\beta$ -hydroxyethyl) trimethylammonium hydroxide is added to the desalted crude oil. On the other hand, Braden is directed to inhibiting corrosion in systems using blends of amines, and according to Braden, the amine blend is custom matched to the condensation pattern (col. 10, ll. 18-19). Moreover, the candidate formulation of amines will have to be revised and tested several times to determine the best formula (col. 10, ll. 42-44). In addition, several properties and characteristics must be considered when selecting amines for the blend packages to be used (col. 9, ll. 12-13). Still further, Braden explains that there is still much of what goes on in the system that is not fully understood so that candidate amine blends must be tested (col. 10, ll. 27-28). All this discussion in Braden teaches away from substituting the single quaternary ammonium compound proposed by Vercammen for the specific amine blends required in Braden. There is absolutely no reason provided in either Braden or Vercammen explaining why one of ordinary skill in the art would believe that a single quaternary ammonium compound, such as that proposed by Vercammen, could function in place of the specific amine blends required in Braden.

The outstanding Office Action alleged that Vercammen teaches the use of choline in place of amines to avoid salt formation, which somehow provides a reason to combine Vercammen and Braden. However, it is respectfully noted that Braden is also concerned with preventing the formation of a wet paste (col. 3, ll. 44-54). Accordingly, the blends of amines proposed by Braden must also avoid the formation of chloride salts or a wet paste based thereon. Accordingly, it is not seen how such an allegedly similar teaching in Vercammen provides a reason to combine Braden and Vercammen in a manner contrary to the blends of amines required in Braden.

Perhaps more importantly, Applicants submit that the data in the present specification demonstrates the unexpected advantages of the presently claimed invention. Consider, for example, Test Example 4 on page 39 and the chart in Fig. 3 of the present application, which demonstrate the unexpected advantages of the presently claimed invention. As shown therein, when the presently claimed quaternary ammonium compound is added to feed water, the magnesium chloride and the calcium chloride which cause hydrogen chloride formation are converted to a chlorine salt of the presently claimed quaternary ammonium compound. However, even though the chlorine salt of the presently claimed quaternary ammonium compound is thermally decomposed, there is no formation of hydrogen chloride which causes the corrosion of metal. In this manner, Applicants respectfully submit that the presently claimed invention unexpectedly prevents secondary corrosion. Along these lines, the data in Table 3 on page 34 shows that the presently claimed compound in the presently claimed method has a vastly superior corrosion speed, compared to ammonium or amines, such as those proposed by Braden. Similarly, the data in Table 5 on page 36 demonstrates that the presently claimed invention

unexpectedly and significantly reduces the formation of chlorine ion when compared to amines. At least for these reasons, Applicants respectfully submit that the presently claimed invention is surprisingly superior and/or shows unexpected advantages when compared to the combined teachings of Shimura, Braden, and/or Vercammen

At least for the foregoing reasons, Applicants respectfully submit that the inventions defined in claims 5, 8, and 11-14 are patently distinguishable from the teachings of Shimura, Braden, and/or Vercammen within the meaning of 35 U.S.C. §102 or 35 U.S.C. §103. Therefore, Applicants respectfully request that the Examiner reconsider and withdrawal all rejections of claims 5, 8, and 11-14.

In view of the foregoing, Applicants submit that this application is in condition for allowance and request a timely notice to this effect. If questions relating to patentability remain, Applicants invite the Examiner to contact the undersigned by telephone.

Applicants believe that no other fees are due at this time. If any other fees are in fact due or if there are any problems with the payment of fees, please charge any underpayments and credit any overpayments to Deposit Account No. 50-1147.

Respectfully submitted,

/R. Eugene Varndell, Jr./  
R. Eugene Varndell, Jr.  
Reg. No. 29,728

Posz Law Group, PLC  
12040 South Lakes Drive, Suite 101  
Reston, VA 20191  
Phone 703-707-9110  
Customer No. 23400